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TRANSMITTAL OF APPEAL BRIEF (Large Entity)	Docket No. MCT.0012D1US

In Re Application Of: **Salman Akram**

Serial No.	Filing Date	Examiner	Group Art Unit
09/853,111	May 10, 2001	Alonzo Chambliss	2827

Invention: **Method of Fabricating Mounted Multiple Semiconductor Dies in a Package (As Amended)**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **April 30, 2004.**

The fee for filing this Appeal Brief is: **$330.00**

☒ A check in the amount of the fee is enclosed.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **20-1504**

Signature

Dated: **June 8, 2004**

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Signature of Person Mailing Correspondence

Cynthia L. Hayden

Typed or Printed Name of Person Mailing Correspondence

cc:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant: Salman Akram	§	Art Unit:	2827
Serial No.: 09/853,111	§	Examiner:	Alonzo Chambliss
Filed: May 10, 2001	§		
For: Method of Fabricating Mounted Multiple Semiconductor Dies in a Package (as Amended)	§	Atty Docket:	MCT.0012D1US 97-0141.02

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APPEAL BRIEF

Sir:

Applicant respectfully appeals from the final rejection mailed February 19, 2004.

I. REAL PARTY IN INTEREST

The real party in interest is the assignee Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

None.

Date of Deposit: June 8, 2004
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Cynthia L. Hayden

Cynthia L. Hayden

III. STATUS OF THE CLAIMS

Claims 15-22, 32, 34, and 35 are rejected. Each rejection is appealed.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF THE INVENTION

Referring to Fig. 1, a semiconductor package 10A includes a first semiconductor die 20 and a second semiconductor die 30 stacked one on top of the other, and a leadframe 170 encapsulated by a package body 11. The package body 11 hermetically seals the first die 20, second die 30 and the leadframe 170 to protect the dies 20, 30 and the leadframe 170 from moisture and physical stress and mechanical damage. See specification at page 4, lines 18 through 29.

The first die 20, which may have a lead-on-chip (LOC) configuration, is mounted face down on the leadframe 170, with its face 21 adjacent a top surface 173 of the leadframe 170. The die 20 may be adhered to the leadframe 170 by an adhesive layer 160. The second die 30, which has a conventional configuration, is mounted face up on the first die 20, with its back 32 adjacent the back 22 of the first die 20, and adhered to the first die 20 by the adhesive layer 160. The adhesive layer 160 may be a nonconductive double adhesive tape such as the type conventionally used in LOC packages. Alternatively, a conductive adhesive layer can be used if a common electrical connection between the two die is required such as ground.

The leadframe 170 has leads 171 and lead fingers 172. The lead fingers 172 are encapsulated within the package body 11 and extend towards a center of the package body 11.

The leads 171 extend outside the package body 11 and may be formed into through-holes, J-leads, gull wings, or other variations thereof. To facilitate soldering of leads 171 to an interconnecting structure, leads 171 may be tin plated or solder dipped.

One advantage of the semiconductor device 10A is that multiple dies may be conveniently encapsulated in a single package body. Another advantage is that the multiple dies may have the same or may not have the same rectangular dimensions, even though both are shown as having the same dimensions in Figure 1. See specification at page 4, line 30 through page 5, line 31.

VI. ISSUES

A. Is Claim 15 Anticipated by Sota?

B. Is Claim 19 Anticipated by Sota?

VII. GROUPING OF THE CLAIMS

Claim 19 may not be grouped and all of the other claims may be grouped with claim 15 for convenience on appeal.

VIII. ARGUMENT

A. Is Claim 15 Anticipated by Sota?

The Examiner's argument that something can be in contact with something else through an intervening element makes no sense.

Claim 15 calls for a method for mounting multiple semiconductor dies on a single leadframe having fingers. The method includes stacking at least two semiconductor dies on top

of one another, such that one of the dies is mounted on top of the leadframe and the other said die is mounted on and in contact with the die mounted on the leadframe fingers.

The cited reference to Sota does not teach two dice "in contact" with one another. The Examiner's position is apparently that something can be in contact with something else through an intervening element.

The Examiner suggests that "in contact" could include thermal or electrical communication. This argument is contrary to the well accepted dictionary definition. For example, Webster's Collegiate Dictionary, 10th Edition, defines contact as the union or junction of surfaces. See definition attached.

The Examiner cites the embodiments of Figures 1 and 2 and assumes the claimed invention must be broad enough to cover both embodiments. There is no basis for this assumption.

In response to the question about whether or not an adhesive connection can be used, of course it can, but the problem is Sota does not merely show an adhesive connection. It shows a die 1 on the top of the leadframe and a die 1 on the bottom of the leadframe. The dice are on opposite sides of the leadframe 3, not both on top of it as called for by claim 15. The dice are separated not only by the resin 6 but, more significantly, by the leadframe 3 as well. Thus, under any conventional definition of "in contact," the dice cannot be in contact.

The Examiner's definition of "in contact" would simply put everything in contact with everything else in the universe, extending claims to a ridiculous extreme, and is completely without any support whatsoever.

Therefore, the rejection should be reversed.

B. Is Claim 19 Anticipated by Sota?

Claim 19 is dependent on claim 15 and calls for one of the dies to be secured to the leadframe and the other of said dies is secured to the die secured to the leadframe.

The final rejection suggests that one of the dies is the die 1 in Sota and the other of the dies secured to the die 1 by the die pad 2 "so that the die is secured to the leadframe."

However, in Sota, the two dies are secured on the opposite side of the leadframe and a die secured to the leadframe does not have another die secured to that die.

Therefore, the rejection of claim 19 should be reversed.

IX. CONCLUSION

Applicant respectfully requests that each of the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,

Date: June 8, 2004

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APPENDIX OF CLAIMS

The claims on appeal are:

15. A method for mounting multiple semiconductor dies on a single leadframe having fingers, comprising:

stacking at least two semiconductor dies having substantially the same rectangular dimensions on top of one another such that one of said dies is mounted on top of the leadframe fingers and the other of said dies is mounted on and in contact with the die mounted on the leadframe fingers; and

wirebonding each of said semiconductor dies to the same leadframe fingers.

16. The method of claim 15, wherein one of said semiconductor dies is mounted back to back on the other of said semiconductor dies.

17. The method of claim 16, wherein one of said semiconductor dies is adhered to the other of semiconductor dies by an adhesive layer.

18. The method of claim 15, wherein a first semiconductor die has a lead-on-chip configuration.

19. The method of claim 15, wherein one of said dies is secured to said leadframe and the other of said dies is secured to the die secured to the leadframe.

20. The method of claim 15, further comprising wirebonding the semiconductor dies to the leadframe, said dies having facing sides and outwardly facing sides by extending wires to bond pads on the outwardly facing sides of said die.

21. A method of connecting multiple semiconductor dies having bonding pads and a single leadframe having lead fingers, comprising:

locating a first semiconductor die on the lead fingers of the leadframe;

stacking a second semiconductor die on said first semiconductor die and in contact with said first semiconductor die; and

electrically connecting the bonding pads of the semiconductor dies to the same lead fingers of the leadframe.

22. The method of claim 21, further comprising encapsulating the semiconductor dies and the leadframe in a single package body.

32. A method for mounting multiple semiconductor dies on a single leadframe having fingers, comprising:

stacking first and second semiconductor dies having substantially the same rectangular dimensions on top of and in contact with one another;

mounting the first semiconductor die on a leadframe finger;

mounting the second semiconductor die on said first semiconductor die; and

wirebonding the first and second semiconductor dies to the same lead fingers of the leadframe.

34. The method of claim 32 wherein the first semiconductor die is mounted back to back on the second semiconductor die.

35. The method of claim 34 wherein the first semiconductor die is adhered to the second semiconductor die by an adhesive layer.

Merriam-Webster's Collegiate® Dictionary

TENTH EDITION

Merriam-Webster, Incorporated
Springfield, Massachusetts, U.S.A.

con·sul·tan·cy \kən-ˈsəl-tᵊn(t)-sē\ *n, pl* **-cies** (1955) **1** : CONSULTATION **2** : an agency that provides consulting services **3** : the position of consultant

con·sul·tant \kən-ˈsəl-tᵊnt\ *n* (1697) **1** : one who consults another **2** : one who gives professional advice or services : EXPERT — **con·sul·tant·ship** \-ˌship\ *n*

con·sul·ta·tion \ˌkän(t)-səl-ˈtā-shən\ *n* (15c) **1** : COUNCIL, CONFERENCE; *specif* : a deliberation between physicians on a case or its treatment **2** : the act of consulting or conferring

con·sul·ta·tive \kən-ˈsəl-tə-tiv, ˈkän(t)-səl-ˌtā-tiv\ *adj* (1583) : of, relating to, or intended for consultation : ADVISORY ⟨~ committee⟩

con·sult·ing \kən-ˈsəl-tiŋ\ *adj* (1801) **1** : providing professional or expert advice ⟨a ~ architect⟩ **2** : of or relating to consultation or a consultant ⟨the ~ room of a psychiatrist⟩

con·sul·tive \kən-ˈsəl-tiv\ *adj* (1616) : CONSULTATIVE

con·sul·tor \kən-ˈsəl-tər\ *n* (1611) : one that consults or advises; *esp* : an adviser to a Roman Catholic bishop, provincial, or sacred congregation

con·sum·able \kən-ˈsü-mə-bəl\ *adj* (1641) : capable of being consumed

consumable *n* (1802) : something (as food or fuel) that is consumable — usu. used in pl.

con·sume \kən-ˈsüm\ *vb* **con·sumed; con·sum·ing** [ME, fr. MF or L; MF *consumer,* fr. L *consumere,* fr. *com-* + *sumere* to take up, take, fr. *sub-* up + *emere* to take — more at SUB-, REDEEM] *vt* (14c) **1** : to do away with completely : DESTROY ⟨fire *consumed* several buildings⟩ **2 a** : to spend wastefully : SQUANDER **b** : USE UP ⟨writing *consumed* much of his time⟩ **3** : to eat or drink esp. in great quantity ⟨*consumed* several kegs of beer⟩ **4** : to engage fully : ENGROSS ⟨*consumed* with curiosity⟩ ~ *vi* **1** : to waste or burn away : PERISH **2** : to utilize economic goods

con·sum·ed·ly \-ˈsü-məd-lē\ *adv* (1707) : as if consumed : EXCESSIVELY

con·sum·er \kən-ˈsü-mər\ *n, often attrib* (15c) : one that consumes: as **a** : one that utilizes economic goods **b** : an organism requiring complex organic compounds for food which it obtains by preying on other organisms or by eating particles of organic matter — compare PRODUCER 4 — **con·sum·er·ship** \-ˌship\ *n*

consumer credit *n* (1927) : credit granted to an individual esp. to finance the purchase of consumer goods or to defray personal expenses

consumer goods *n pl* (1890) : goods that directly satisfy human wants

con·sum·er·ism \kən-ˈsü-mə-ˌri-zəm\ *n* (1944) **1** : the promotion of the consumer's interests **2** : the theory that an increasing consumption of goods is economically desirable; *also* : a preoccupation with and an inclination toward the buying of consumer goods — **con·sum·er·ist** \-rist\ *n* — **con·sum·er·is·tic** \kən-ˌsü-mə-ˈris-tik\ *adj*

consumer price index *n* (1948) : an index measuring the change in the cost of typical wage-earner purchases of goods and services expressed as a percentage of the cost of these same goods and services in some base period — called also *cost-of-living index*

con·sum·ing \kən-ˈsü-miŋ\ *adj* (1920) : deeply felt : ARDENT ⟨a ~ interest⟩; *also* : ENGROSSING

¹con·sum·mate \ˈkän(t)-sə-mət, kən-ˈsə-mət\ *adj* [ME *consummat* fulfilled, fr. L *consummatus,* pp. of *consummare* to sum up, finish, fr. *com-* + *summa* sum] (1527) **1** : complete in every detail : PERFECT **2** : extremely skilled and accomplished ⟨a ~ liar⟩ **3** : of the highest degree ⟨~ skill⟩ ⟨~ cruelty⟩ — **con·sum·mate·ly** *adv*

²con·sum·mate \ˈkän(t)-sə-ˌmāt\ *vb* **-mat·ed; -mat·ing** *vt* (1530) **1 a** : FINISH, COMPLETE ⟨~ a business deal⟩ **b** : to make perfect **c** : ACHIEVE **2** : to make (marital union) complete by sexual intercourse ⟨~ a marriage⟩ ~ *vi* : to become perfected — **con·sum·ma·tive** \ˈkän(t)-sə-ˌmā-tiv, kən-ˈsə-mə-tiv\ *adj* — **con·sum·ma·tor** \ˈkän(t)-sə-ˌmā-tər\ *n*

con·sum·ma·tion \ˌkän-sə-ˈmā-shən\ *n* (14c) **1** : the act of consummating ⟨the ~ of a contract by mutual signature⟩; *specif* : the consummating of a marriage **2** : the ultimate end : FINISH

con·sum·ma·to·ry \kən-ˈsə-mə-ˌtōr-ē, -ˌtȯr-\ *adj* (1648) **1** : of or relating to consummation : CONCLUDING **2** : of, relating to, or being a response or act (as eating or copulating) that terminates a period of usu. goal-directed behavior

con·sump·tion \kən-ˈsəm(p)-shən\ *n* [ME *consumpcioun,* fr. L *consumption-, consumptio,* fr. *consumere*] (14c) **1 a** : a progressive wasting away of the body esp. from pulmonary tuberculosis **b** : TUBERCULOSIS **2** : the act or process of consuming **3** : the utilization of economic goods in the satisfaction of wants or in the process of production resulting chiefly in their destruction, deterioration, or transformation

¹con·sump·tive \-ˈsəm(p)-tiv\ *adj* (1664) **1** : tending to consume **2** : of, relating to, or affected with consumption — **con·sump·tive·ly** *adv*

²consumptive *n* (1666) : a person affected with consumption

¹con·tact \ˈkän-ˌtakt\ *n* [F or L; F, fr. L *contactus,* fr. *contingere* to have contact with — more at CONTINGENT] (1626) **1 a** : union or junction of surfaces **b** : the apparent touching or mutual tangency of the limbs of two celestial bodies or of the disk of one body with the shadow of another during an eclipse, transit, or occultation **c (1)** : the junction of two electrical conductors through which a current passes **(2)** : a special part made for such a junction **2 a** : ASSOCIATION, RELATIONSHIP **b** : CONNECTION, COMMUNICATION **c** : an establishing of communication with someone or an observing or receiving of a significant signal from a person or object ⟨radar ~ with Mars⟩ **3** : a person serving as a go-between, messenger, connection, or source of special information ⟨business ~s⟩ **4** : CONTACT LENS

²contact \ˈkän-ˌtakt, kən-ˈ\ *vb* (1834) : to make contact ~ *vt* **1** : to bring into contact **2 a** : to enter or be in contact with : JOIN **b** : to get in communication with ⟨~ your local dealer⟩

usage The use of *contact* as a verb, esp. in sense 2b, is accepted as standard by almost all commentators except those who write college handbooks …

³contact *adj* (1888) : maintaining, involving, or activated by contact ⟨~ poisons⟩ ⟨~ sports⟩ …

contact binary *n* (1962) : a binary star system in which the two stars are close enough together for material to pass between them …

contact hitter *n* (1962) : a hitter in baseball who seldom strikes out

contact inhibition *n* (1965) : cessation of cellular undulating movements upon contact with other cells with accompanying cessation of cell growth and division

contact language *n* (1950) : PIDGIN

contact lens *n* (1888) : a thin lens designed to fit over the cornea and usu. worn to correct defects in vision

contact print *n* (1890) : a photographic print made with the negative in contact with the sensitized paper, plate, or film

con·ta·gion \kən-ˈtā-jən\ *n* [ME, fr. MF & L; MF, fr. L *contagion-, contagio,* fr. *contingere* to have contact with, pollute] (14c) **1 a** : a contagious disease **b** : the transmission of a disease by direct or indirect contact **c** : a disease-producing agent (as a virus) **2 a** : POISON **b** : contagious influence, quality, or nature **c** : corrupting influence or contact **3 a** : rapid communication of an influence (as a doctrine or emotional state) **b** : an influence that spreads rapidly

con·ta·gious \-jəs\ *adj* (14c) **1** : communicable by contact : CATCHING ⟨~ diseases⟩ **2** : bearing contagion **3** : used for contagious diseases ⟨a ~ ward⟩ **4** : exciting similar emotions or conduct in others ⟨~ enthusiasm⟩ — **con·ta·gious·ly** *adv* — **con·ta·gious·ness** *n*

contagious abortion *n* (1910) : a contagious or infectious disease (as a brucellosis) of domestic animals characterized by abortion

con·ta·gium \kən-ˈtā-j(ē-)əm\ *n, pl* **-gia** \-j(ē-)ə\ [L, contagion, fr. *contingere*] (1870) : a virus or living organism capable of causing a communicable disease

con·tain \kən-ˈtān\ *vb* [ME *conteinen,* fr. OF *contenir,* fr. L *continēre* to hold together, hold in, contain, fr. *com-* + *tenēre* to hold — more at THIN] *vt* (14c) **1** : to keep within limits: as **a** : RESTRAIN, CONTROL **b** : CHECK, HALT **c** : to follow successfully a policy of containment toward **d** : to prevent (as an enemy or opponent) from advancing or from making a successful attack **2 a** : to have within : HOLD **b** : COMPRISE, INCLUDE **3 a** : to be divisible by usu. without a remainder **b** : ENCLOSE, BOUND ~ *vi* : to restrain oneself — **con·tain·able** \-ˈtā-nə-bəl\ *adj*

syn CONTAIN, HOLD, ACCOMMODATE mean to have or be capable of having within. CONTAIN implies the actual presence of a specified substance or quantity within something ⟨the can *contains* a quart of oil⟩. HOLD implies the capacity of containing or the usual or permanent function of containing or keeping ⟨the bookcase will *hold* all my textbooks⟩. ACCOMMODATE stresses holding without crowding or inconvenience ⟨the hall can *accommodate* 500 people⟩.

contained *adj* (1653) : RESTRAINED; *also* : CALM

con·tain·er \kən-ˈtā-nər\ *n* (15c) : one that contains; *esp* : a receptacle (as a box or jar) for holding goods — **con·tain·er·less** \-ləs\ *adj*

con·tain·er·board \-ˌbōrd, -ˌbȯrd\ *n* (ca. 1924) : corrugated or solid paperboard used for making containers

con·tain·er·i·sa·tion, con·tain·er·ise *Brit var of* CONTAINERIZATION, CONTAINERIZE

con·tain·er·i·za·tion \kən-ˌtā-nə-rə-ˈzā-shən\ *n* (1956) : a shipping method in which a large amount of material (as merchandise) is packaged into large standardized containers

con·tain·er·ize \kən-ˈtā-nə-ˌrīz\ *vt* **-ized; -iz·ing** (1956) **1** : to ship by containerization **2** : to pack in containers

con·tain·er·port \-nər-ˌpōrt, -ˌpȯrt\ *n* (1970) : a shipping port specially equipped to handle containerized cargo

con·tain·er·ship \-nər-ˌship\ *n* (1966) : a ship specially designed or equipped for carrying containerized cargo

con·tain·ment \kən-ˈtān-mənt\ *n* (1655) **1** : the act, process, or means of containing **2** : the policy, process, or result of preventing the expansion of a hostile power or ideology

con·tam·i·nant \kən-ˈta-mə-nənt\ *n* (1922) : something that contaminates

con·tam·i·nate \kən-ˈta-mə-ˌnāt\ *vt* **-nat·ed; -nat·ing** [ME, fr. L *contaminatus,* pp. of *contaminare;* akin to L *contagio* contagion] (15c) **1 a** : to soil, stain, corrupt, or infect by contact or association ⟨bacteria *contaminated* the wound⟩ **b** : to make inferior or impure by admixture ⟨iron *contaminated* with phosphorus⟩ **2** : to make unfit for use by the introduction of unwholesome or undesirable elements — **con·tam·i·na·tive** \-ˌnā-tiv\ *adj* — **con·tam·i·na·tor** \-ˌnā-tər\ *n*

syn CONTAMINATE, TAINT, POLLUTE, DEFILE mean to make impure or unclean. CONTAMINATE implies intrusion of or contact with dirt or foulness from an outside source ⟨water *contaminated* by industrial wastes⟩. TAINT stresses the loss of purity or cleanliness that follows contamination ⟨*tainted* meat⟩ ⟨a politician's *tainted* reputation⟩. POLLUTE, sometimes interchangeable with *contaminate,* distinctively may imply that the process which begins with contamination is complete and that what was pure or clean has been made foul, poisoned, or filthy ⟨the *polluted* waters of the river⟩. DEFILE implies befouling of what could or should have been kept clean and pure or held sacred and commonly suggests violation or desecration ⟨*defile* a hero's memory with slanderous innuendo⟩.

con·tam·i·na·tion \kən-ˌta-mə-ˈnā-shən\ *n* (15c) **1** : a process of contaminating : a state of being contaminated **2** : CONTAMINANT

conte \ˈkō⁽ⁿ⁾t\ *n* [F] (1891) : a usu. short tale of adventure

con·temn \kən-ˈtem\ *vt* [ME *contempnen,* fr. MF *contempner,* fr. L *contemnere,* fr. *com-* + *temnere* to despise] (15c) : to view or treat with contempt : SCORN *syn* see DESPISE — **con·tem·ner** *also* **con·tem·nor** \-ˈtem-nər, -ˈte-mər\ *n*

con·tem·plate \ˈkän-təm-ˌplāt\ *vb* **-plat·ed; -plat·ing** [L *contemplatus,* pp. of *contemplari,* fr. *com-* + *templum* space marked out for observation of auguries — more at TEMPLE] *vt* (1537) **1** : to view or consider with continued attention : MEDITATE ON **2** : to view as contingent or probable or as an end or intention ~ *vi* : PONDER, MEDITATE *syn* see CONSIDER — **con·tem·pla·tor** \-ˌplā-tər\ *n*

con·tem·pla·tion \ˌkän-təm-ˈplā-shən, -ˌtem-\ *n* (13c) **1 a** : concentration on spiritual things as a form of private devotion **b** : a state of mystical awareness of God's being **c** : an act of considering with